MASSACHUSETTS

AGRICULTURAL COLLEGE,

AMHERST, MASS.

Chapel - Library

The Massachusetts Agricultural College.

Thirty-five years ago, in the midst of the greatest struggle the world has ever witnessed, when every muscle was being strained to the utmost to provide means for preserving the national existence, our Senators and Representatives in Congress assembled, reversing the old adage, "In time of peace prepare for war," calmly turned aside from the absorbing topics of the day, and in time of war prepared for peace by passing an act for the benefit of agriculture and the mechanic arts, providing for the establishment of national schools of science in every State of this great country. They were to be *colleges*, in which it was explicitly declared the leading object should be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the Legislatures of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life. In such broad and liberal spirit, trammelled by few conditions, was framed this earliest act of Congress for the promotion of national popular education. In the words of the distinguished author himself, the Hon. Justin S. Morrill of Vermont, "the bill proposed to establish at least one college in every State, upon a sure and perpetual foundation, accessible to all, but especially to the sons of toil, where all the needful science for the practical avocations of life shall be taught, . . and where agriculture, the foundation of all present and future prosperity, may look for troops of earnest friends, studying its familiar and recondite economies, and at last elevating it to that higher level where it may fearlessly invoke comparison with the most advanced standards of the world."

From the sale of the 360,000 acres of the public lands, allotted to Massachusetts, was realized the sum of $208,464, and in 1871 this amount was further increased by the Legislature to $360,000, the whole constituting a perpetual fund for the promotion of education in agriculture and the mechanic arts, two-thirds of the income to be annually paid to the treasurer of the Agricultural College and one-third to the treasurer of the Institute of Technology.

Twenty-five years later, a second great act of Congress established in connection with each college a department of agricultural experimentation, at an annual expenditure of three-fourths of a million dollars.

Again three years, and the Hon. Justin S. Morrill, with whom had originated the first act, after a careful observance for twenty-eight years of the colleges he had been instrumental in establishing, came forward with a new measure for their endowment, by an annual grant to each one of the same amount, commencing with $15,000 and increasing each year $1,000 till the maximum of $25,000 had been reached, at which figure it was to remain without further increase. This again was divided in Massachusetts, one-third being paid to the Institute of Technology and two-thirds to this college.

Never was there a more munificent gift by a nation in the cause of education. First, ten million acres of the public lands, the proceeds from the sale of which to constitute an inviolable fund for the establishment and maintenance of at least one college in every State which should accept the grant; second, an annual appropriation of three-quarters of a million dollars for purposes of investigation and experimentation in all matters pertaining to the intelligent practice of agriculture; third, an annual appropriation of one million dollars for further maintenance and support. It was a fortunate period in which these colleges were established. The rapid development of the various branches of mechanical and physical science had been accompanied by a corresponding application of them in industrial pursuits and a consequent demand for thoroughly trained and competent men. In the hearing before the committee on education the effect was thus briefly epitomized. The result was that large numbers of the most promising youth of the country were drawn to these institutions which opened up so many possibilities. This movement gave an impulse which was felt by every school of science in the country. It forced new methods of instruction to meet the constantly increasing demand. It compelled expensive outlays for equipment which should keep pace with this new and practical education of the people. It was the "awakening of a new intellectual life, and there was a certain freshness of interest, a spirit of youth, a generous enthusiasm, which argued the happiest results, and which time has only strengthened as the years roll on." The pet idea of Ezra Cornell, that he would "found an institution where any person could find instruction in any study," would seem to be realized. To-day 65 colleges, thoroughly equipped with laboratories and workshops, and provided with the latest and most approved apparatus, officered by 1,600 professors and instructors, shelter within their walls an army of young men 21,000 strong. Twenty-one regiments, captained and led by the best and keenest intellects available, are all making for progress and development along certain well-defined lines. Five, planting their outposts in every nook and corner of the vast domain of nature, are calling upon the earth, the air, the water

to give up their secrets. Sixteen are pushing their way in the various industries, but each and all are making instantly felt the contact of a new and vigorous life and awakening fresh enterprise and fresh effort. "Many of the youth composing this vast army receive their entire support from home, but many others are supporting themselves by their own exertions, almost or wholly unaided, and many others come from homes where every dollar contributed to the education of a son or daughter involves some appreciable sacrifice. They are all acquiring habits of industry, energy and self-reliance. They represent more fully than any other class of institutions the real bone and sinew and brain of the country. They represent in no small degree the brain and purpose of the coming generation. They represent the great body of the people, from which are very largely recruited the best elements of our political, our social and industrial activities."

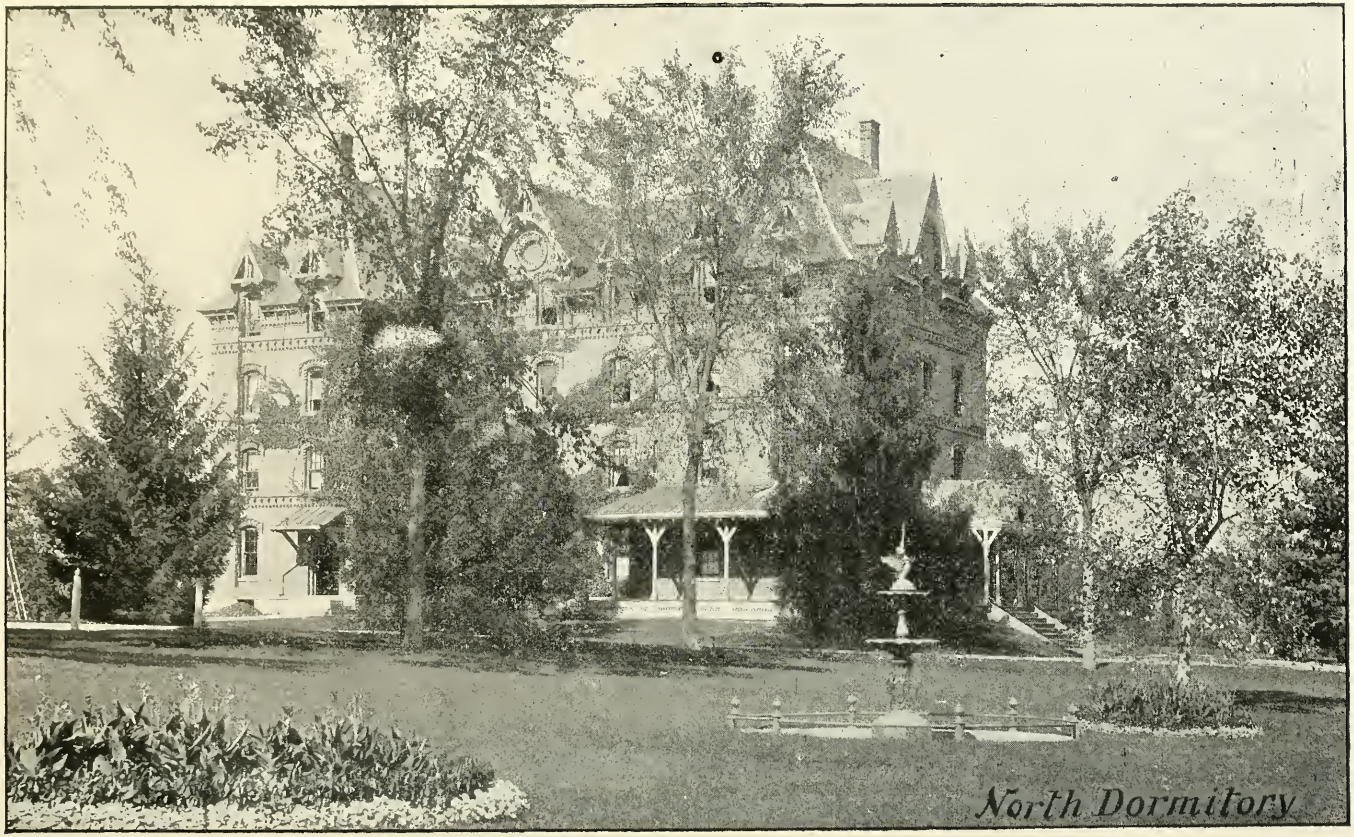
Thirty years ago this year the Massachusetts Agricultural College first opened its doors to students, and in this the closing year of its third decade of existence it seems pertinent to inquire whether it has warranted the generous outlay of nation and State for its support,—whether it has fulfilled the purpose for which it was founded, and sent forth honest, manly citizens to serve their country and their State and adorn the different trades and professions of life. The wealth of a college is the life of her sons, and her success is measured by the success of her sons.

In its brief history of one score years and ten, 1,096 men have attended the college and 510 have graduated; 87 have passed away, 15 only from among the graduates and 72 from the remainder. Of the living, 348 are in agricultural pursuits distributed as follows: farmers, 186; farm superintendents, 23; market gardeners and florists, 46; veterinarians, 16; creamery managers, 6; stock and poultry raisers, 10; entomologists, 8; officers in experiment stations, 19; in the fertilizer business, 12; teachers in agricultural colleges, 22. Other industries are represented by chemists, 9; civil engineers and architects, 43; electricians, 10; mechanics, 40; employed on railroads, 15; dentists, 6; druggists, 7; teachers, 34; ministers, 8; students for advanced degrees, 39; postal clerks, 7; doctors, 40; journalists and publishers, 18; in the army and navy, 5; lawyers, 20; and in business, 270. Our graduates are found in every State, filling positions of honor. The record is a good one. We have furnished Japan with 1 president and 7 professors. We have given presidents to Rhode Island and North Dakota and a vice-chancellor to Indiana. We have sent 5 professors to Rhode Island, 2 each to Alabama, Michigan, Ohio, Mississippi, Missouri, Tennessee, Indiana, Connecticut and New Hampshire, and 1 each to Delaware, Minnesota, Illinois, Virginia, Maine, Colorado, Texas

South Dormitory

and Maryland. Yale has drawn upon our lawyers for an instructor in criminal law and medico-legal jurisprudence, Harvard has called our graduates to her veterinary and dental schools, and Canada has found a botanist for McGill University. We have furnished the vice-director to the office of experiment stations at Washington, and directors to Indiana, North Dakota, Vermont, Rhode Island and Brazil, besides filling 63 other positions in the different experiment stations of the country.

Thirty years ago, with a staff of five instructors and four buildings, without a library, without appliances of any sort, the college opened its doors to the 27 young men who presented themselves for admittance. To-day, if one of these same young men should revisit the college, he could but marvel at the change. He will find an opportunity of securing a maximum education at a minimum cost, tuition free, board at a trifling figure and work to be had for the asking, if the necessities of his case demand such aid. He will find a farm of 150 acres under cultivation, with model barn stocked with 100 head of cattle and equipped with the latest and most improved machinery. He will find a horticultural department of 100 acres, with greenhouses, orchards and grounds laid out for the practical study of market gardening, floriculture, fruit culture and forestry. He will find an experiment department, some 80 acres in extent, with laboratories, greenhouses, insectaries and barns, where are being worked out all conceivable problems in the use of fertilizers, in the feeding of animals, in soil investigations, plant diseases, testing of fruits and vegetables, prevention of insect ravages, and relations of temperature and moisture to growth. He will find a growing library of 18,000 carefully selected volumes, almost entirely scientific in its character and well abreast of the literature of the day, in which he will not only be invited and urged to enter, but to which he will be sent to look up information for himself, and taught how to investigate any given subject and to weigh and value the testimony of authorities. He will find a corps of 18 professors and assistants, each doing faithfully and conscientiously the work assigned him. He will find a certain definite required curriculum for three years, with liberty to select and specialize in the fourth; and together with this, eleven short winter courses especially adapted to the requirements of those whom circumstances debar from spending a longer time in the prosecution of their studies. He will find a superstructure of agricultural education, reared somewhat after this fashion: agriculture the foundation; botany, chemistry, zoölogy and mathematics the four corner-stones; while the walls are solidly built up with English, horticulture, floriculture and forestry on the one side, English, physiology, entomology, comparative anatomy of the domestic animals and veterinary on the other, English, mechanics, physics and civil



North Dormitory

engineering on the third, and English, French, German, political economy and constitutional history on the fourth. The study of his own language, he will find, is made the basis of all study, interwoven with every course, in fact, the very warp and woof of every branch pursued. If he wants to become a farmer, a market gardener or a fruit grower, he will find the appliances at hand and every opportunity to become conversant with the art. If he wants to become a good chemist, every facility will be given him. If he wants to become a good botanist, few places will offer him better instruction. If he wants to become a good entomologist, he will have to search the length and breadth of the land to find equal opportunities. If he wants to become a good civil engineer, the foundations will be laid deep and strong. And he will further find, if he inquires, that the course covers such extensive ground in botany, chemistry, physiology and allied branches that graduates entering veterinary or medical schools stand at a great advantage, and in the former case are allowed one year's time. In fact, he will find that the whole aim and purpose of the college has been to so educate its students as to prepare them to play well their part in the "several pursuits and professions of life."

It is too early yet to ascertain how far the eleven short winter courses established this year meet the requirements of those whose circumstances forbid a longer stay at the college. The effort has been made to make them as practical as possible, along such lines as experience has shown to be most helpful. To benefit the many and "to give instruction," as is finely written over one of the archways in the great library at Washington, "to those who cannot procure it for themselves" is the sole aim of these winter courses. In the brief time allotted, the instruction must be more or less elementary in its character; but the double courses provided permit concentrated attention upon a given subject in one year, or continuous study in successive years. The increasing activity of women in the industrial pursuits, and the consequent demand for instruction, has led to the opening of special elective courses for them, in such branches as botany, entomology, floriculture, fruit culture, market gardening and the dairy.

The English Department.

The English department in the Massachusetts Agricultural College aims to secure the following results: Ability to give oral and written expression of thought in correct, effective English; ability to present, in logical form, oral and written arguments on questions assigned for debate; such acquaintance with the masterpieces of English literature as shall enrich the student's mind with the best thought of the English language.

During Freshman year (three hours each week), and Sophomore year (two hours each week), Genung's *Outlines of Rhetoric* is the text-book. The work in written expression consists of written exercises, illustrating the principles developed in the text-book, and essays upon subjects assigned by the instructor. Oral expression is cultivated by exercises in declamation, first before the instructor, then in presence of the class. Particular attention is given to the cultivation of a *natural* style in speaking and such suggestions respecting management of the voice, articulation, and gesticulation are given as individual circumstances require. During Sophomore year especial emphasis is laid upon practical exercises in description, narration, exposition, and argumentative writing.

Four hours each week are given to English during the first two terms of Junior year, and two hours each week during the third term. Pancoast's *Representative English Literature* is the text-book, the work as outlined therein being supplemented by collateral readings. The *representative* selections are studied critically and furnish subjects for essays. At least four orations are written by each member of the class during the year, which orations are corrected by the instructor, rehearsed before him and delivered in presence of the class.

The first term of Senior year, (two hours each week), is given to Jevons's *Logic* (Science Primer Series). One essay on a subject, biographical, historical or literary, is written during this term. During the second and third terms (two hours each week) written and oral debates are required, particular attention being given to preparation of briefs and to logical argument. Recent writers of English literature are studied and time is allowed for the preparation of graduation theses.

An elective in English during Senior year (five hours each week) offers, to those who desire it, a course in the elements of Anglo-Saxon grammar and the reading of easy Anglo-Saxon prose; also a course in the history of the English language, in English etymology, and in the critical study of the works of the masters of English speech.

The Course in Agriculture.

It is the purpose and plan of the Agricultural department of the college to focus the information gathered in a general study on the successful operation and management of a farm; to show how to make "two blades of grass grow where one grew before;" to improve the credit side of the farmer's balance sheet; and to enhance the profits, the pleasure, and the nobility of agriculture.

To this end a practical course of lectures has been arranged, supplemented by text-books, library references, class-room demonstrations and practical work in every principal division of the subject.

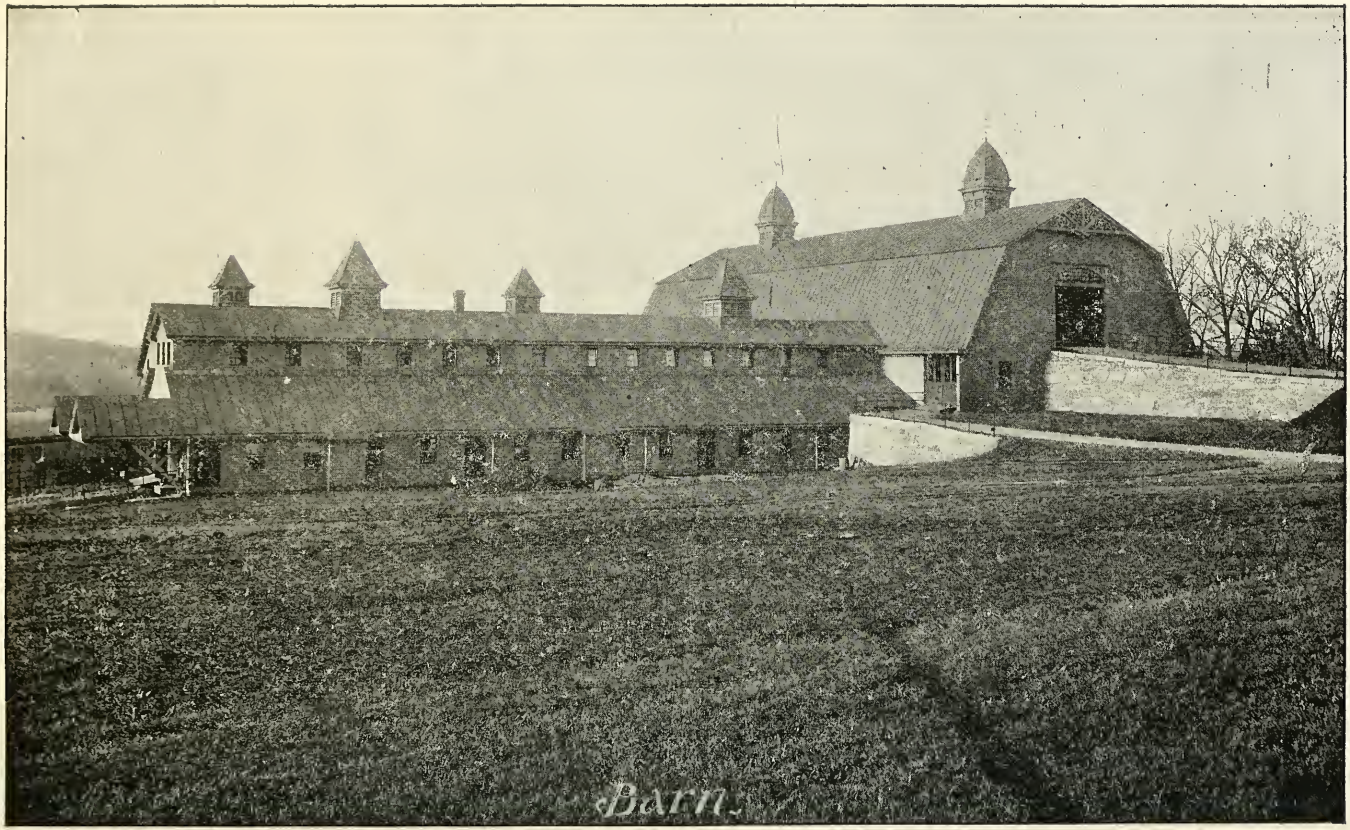
The soil is first studied in its origin and formation, noticing the different kinds of soils, their value and most advantageous management; their physical properties and how to improve them; their composition in relation to productiveness, and lastly, the methods of testing soils to determine their value and adaptability to different farm crops.

Then soil improvement is discussed including all the various processes for making soils more productive, without expense for artificial plant food, by improving their physical and mechanical condition. Tillage, subsoiling, mixing, drainage, irrigation, etc. are each taught by means of lectures and practical demonstrations.

The subject of manures and fertilizers is treated in a manner to enable the student to understand how to secure the greatest fertilizing effect at the lowest cost. Manurial materials are carefully studied with reference to their constituents and effect on the growth of farm crops. The special requirements of various crops are brought out, and the needs of different soils. The course in this particular enables the farmer to save dollars per acre on every crop he grows, by teaching him to avoid unnecessary expense for useless fertilizing materials and to procure just the articles his soils and crops require. All kinds of farm crops are considered with especial reference to their economic agricultural value, and the best methods of management.

Some attention is given to farm implements, machinery, and equipments, as well as to approved plans of farm buildings.

An entire year is devoted to the study of animal husbandry giving prominence to stock breeding, breeds of farm animals, their management, etc., while the scientific and practical feeding of animals is taught with much care and thoroughness.



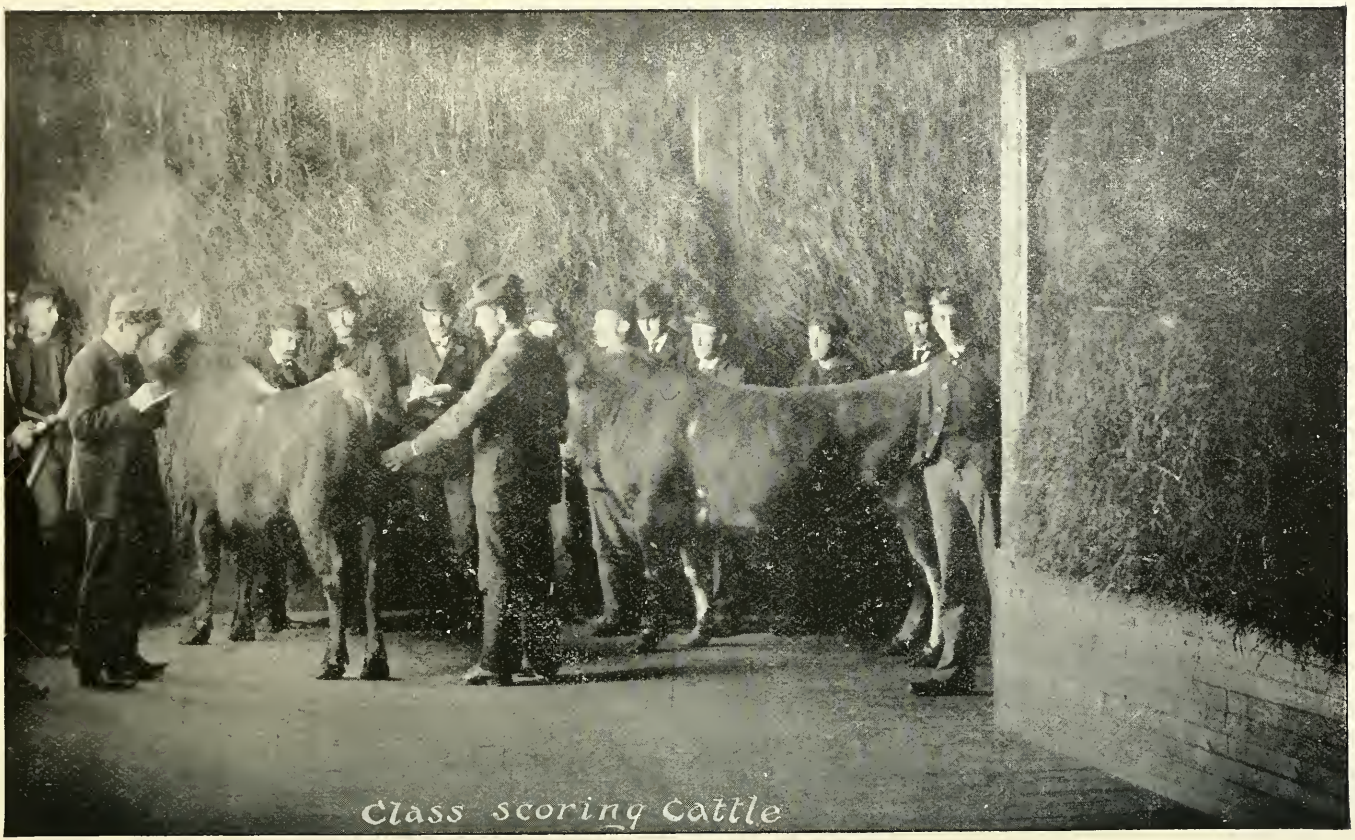
Barn.

Dairy instruction is given in an especially effective way by supplementing class-room work with actual operations in each department of dairying, including separation of cream, ripening, butter-making, milk testing, and pasteurizing milk and cream.

The facilities for instruction embrace besides lectures, text-books, and library, a large collection of apparatus for illustration. Collections of soils, fertilizing materials, crops, seeds, weeds, grasses, farm implements, models of farm animals, etc., are in constant use in the class-room.

The college stud of French Coach and Percheron horses, the cattle of all leading dairy breeds, and the sheep and swine are a valuable object lesson, and are used in judging to a scale of points, and illustrating excellencies and defects in their respective classes.

The Dairy department is fully equipped with a large variety of the best apparatus, and is operated under the direction of experts in milk testing, separating, and butter-making.



Class scoring cattle

Department of Mathematics and Engineering.

The course of study in the mathematical and engineering department includes not only the subjects pure mathematics and engineering, which its name implies, but also physics and drawing; the work of the first three years being prescribed, that of the senior year, elective.

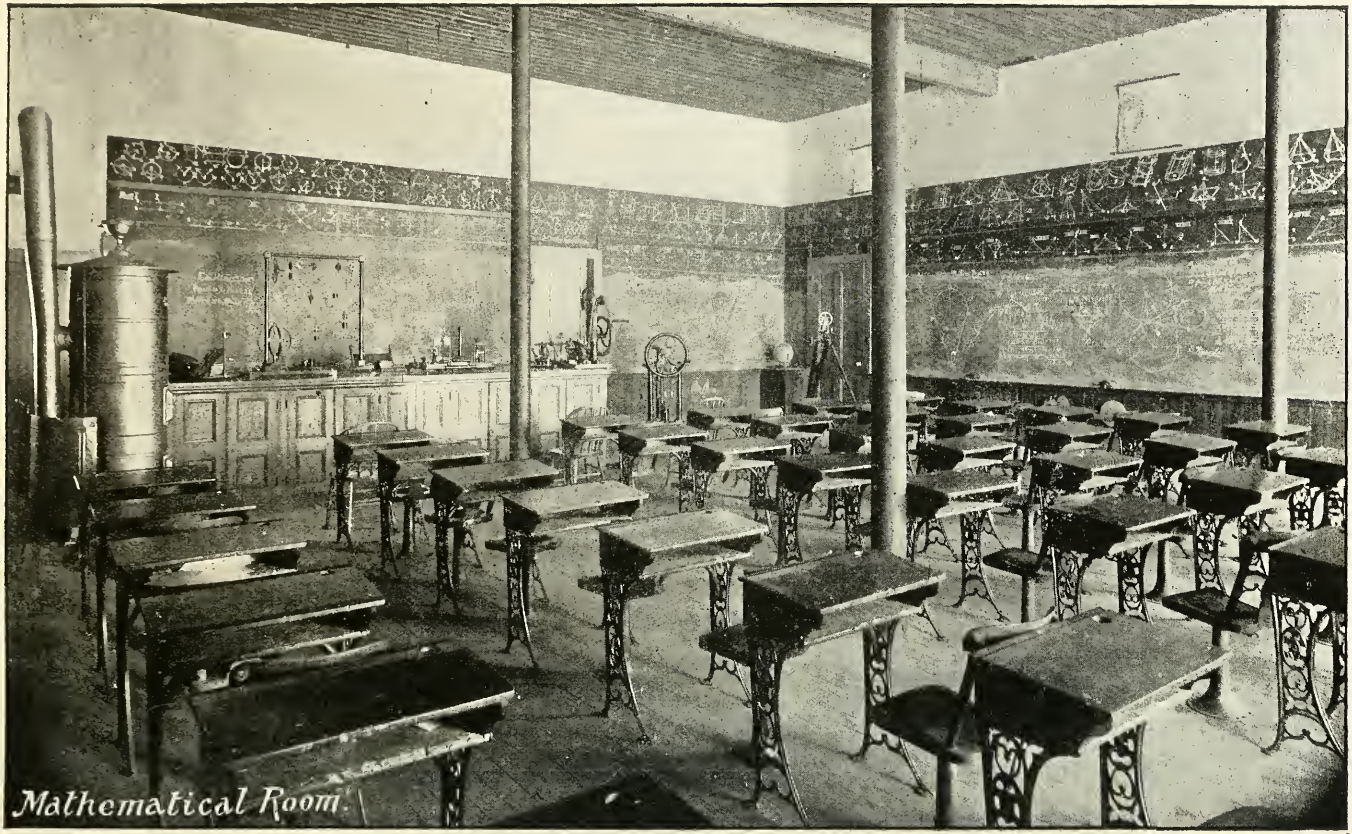
In the Freshman year, book-keeping, advanced algebra, plane and solid geometry are studied in the order mentioned, the student being thoroughly drilled in these subjects in the recitation room and being required to hand in, daily, problems solved outside of the class-room.

Trigonometry is then taken up, in the fall term of the Sophomore year, as a basis for the study of plane surveying. The latter subject is begun in the winter term of the Sophomore year with a study of the methods of plane surveying and the care, adjustment and manipulation of the instruments, so that the student may be prepared to go into the field in spring to make actual surveys, without the delay attendant upon acquiring a knowledge of the manipulation of the instruments at that time. The department is well equipped for this work, having upwards of a dozen instruments,—plane-table, transits, levels, and compasses,—and numerous tapes, chains, pins, rods, and poles.

In the next year, the Junior, the work in the department is limited to the study of physics, which continues throughout the year. The subject is conducted primarily as a lecture-course, supplemented however by recitations and by a laboratory course in the winter term. The principles of mechanics, electricity, light, sound, and heat are successively treated in the lecture-room, while the students are assigned many problems to be solved outside of the class-room, as well as parallel courses of outside reading.

Two terms are devoted to the study of drawing,—the winter terms of the Freshman and Sophomore years respectively. In the first of these, the elements of perspective, and free-hand drawing in charcoal and in pencil, from casts and simple objects, are taken up; while in the succeeding year, the course is concluded by the study of mechanical drawing, the theory of projections, and shades and shadows.

The above mentioned studies, briefly outlined, constitute the prescribed work of the mathematical and engineering departments. Two electives, however, are open to the students in the Senior year,—one in engineering, the other in mathematics. The latter is offered with a view to supple-



Mathematical Room.

menting the course in engineering and to enable such students as may think of entering the field of teaching, to carry their study of mathematics somewhat further than is at present possible in the first three years of the course. Five hours a week being allowed to the electives, it is possible in this course of study to take up, during the year, not only analytic geometry but also differential and integral calculus.

The course in engineering is designed to give to the student sufficient knowledge of the elements of engineering to enable him to apply his knowledge of landscape gardening, forestry, horticulture, etc., to the development of property and the laying out of estates. It comprises a study of the methods of topographical surveying, road and railroad curves and earthwork, highway construction, and elementary structures; and while it cannot be hoped in the time devoted to the subject to give the student a thorough knowledge of civil engineering, it is believed that a good foundation is laid for the future study of that science, and that a working knowledge of the branches of the subject essential to the landscape architect is acquired by the student.

Botanic Museum.

The Department of Botany.

A knowledge of botany in connection with the study of agriculture is essential because the laws which govern all plants fall under the domain of botany, furnishing the basis of all agricultural investigation. In an agricultural institution, a course in botany should be comprehensive, and at the same time deal especially with those branches most closely allied to agriculture.

The course is intended to follow a natural and logical order. In the Freshman year the student devotes his time to the study of morphology of the plant, or in other words to the study of the seed, root, stem, leaf, flower, fruit, etc., and also to systematic or analytical botany. The work of this year gives the student a knowledge of the parts of a plant, together with some familiarity with our common species. A few years ago even our higher institutions of learning did not attempt to carry botany beyond this stage, leaving the student with merely a more or less cumbersome Latin vocabulary. To-day, however, it is admitted that it is of prime importance to know *what* the plant *does*, and *how* it does it.

During the first part of the Sophomore year economic botany is taken up. This includes a study of our common trees, shrubs, and grasses, as well as the useful properties of plants. This work is followed by the study of elementary physiology and histology, or minute structure of a few types, the exercises being carried on in the laboratory.

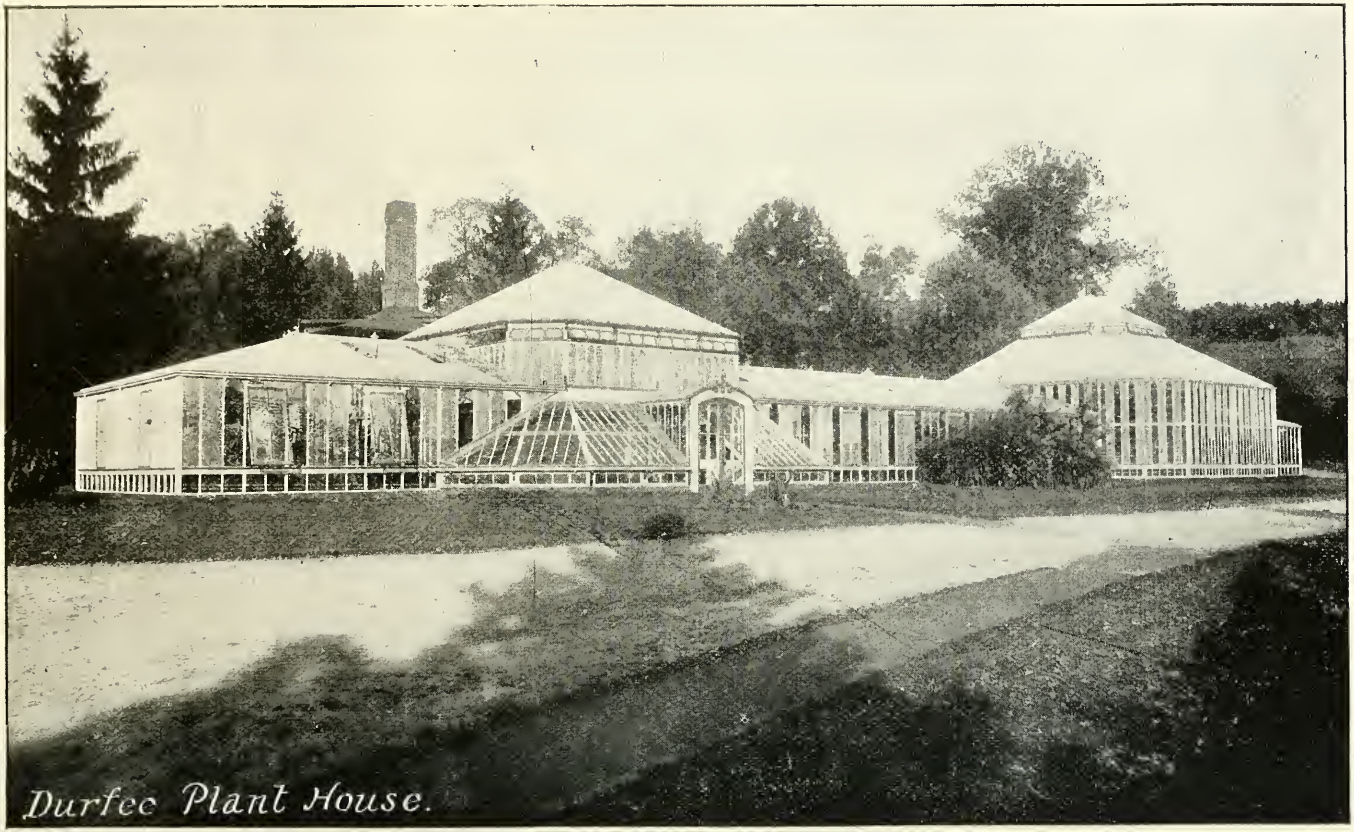
The above fundamental features of botany are now more or less covered in some of our preparatory schools, and after this elementary knowledge has been acquired, the most important branches relating to agriculture that can be pursued are vegetable physiology and pathology, or in other words the study of the normal functions and the diseases of plants.

The senior year, which is elective, is given up to a consideration of the above mentioned subjects, for the study of which a large amount of material and a great variety of apparatus are required. In the study of plant diseases abundant material can be obtained from the green-houses, orchards, and gardens; but for physiological work, which is largely experimental, an extensive equipment is essential. For this purpose the laboratory is well supplied with microscopes, microtomes, histological reagents, and in fact innumerable forms of appliances for experimenting with and illustrating the phenomena of plant life. Provision is also made during

Botanical Laboratory.

Senior year for those students desiring to pursue original investigation, material and apparatus being placed at their disposal.

In addition to the above there is offered a post-graduate course in plant physiology and its relation to agriculture. This work must be of an original character, and upon its successful completion, (together with work in some other subject), the student may receive the degree of M. S.



Durfee Plant House.

The Horticultural Department.

In the work of instruction in Horticulture the aim is to make a practical application of the principles of plant growth and fertilization to the production of fruit, market garden and greenhouse crops and to the cultivation of trees and shrubs for ornamentation of private and public grounds.

FRUIT CULTURE.

For this work the department is equipped with orchards of all the standard and new varieties of the large fruits, and plantations of small fruits, the numbers of varieties of each being as follows:

Apples 179, Pears 32, Peaches 33, Plums 85, Cherries 32, Quinces 7, Grapes 164 named varieties and 340 seedlings, Currants 25, Blackberries 22, Red Raspberries 24, Black-cap Raspberries 26, Hybrid Raspberries (Shaffer seedlings) 300, Strawberries 206 named varieties and about 500 seedlings.

MARKET GARDENING.

Limited areas of all of the market garden crops, of the best standard and most promising new varieties are grown under glass and in the field by the most approved methods. These crops are then prepared for market and sold thus giving the student a practical knowledge of the whole business. New varieties are tested in separate plots and their merits discussed before the students.

FLORICULTURE.

For teaching this branch of horticulture the equipment consists of large greenhouses divided into rooms or houses for special crops, such as the rose, carnation, camellia and azalea, three propagating rooms, a cold grapery and a large number of hot bed sashes, mats, shutters, etc. All of the commercial greenhouse crops are grown in limited quantities such as roses, carnations, chrysanthemums and general flowering plants for the house and garden. The large greenhouses contain a very complete collection of botanical and economic plants like the sago, date, fan and rattan palms, the dwarf manilla, common and Abyssinian bananas, the tea, coffee, camphor, cinnamon, guava, and India rubber.

FORESTRY AND LANDSCAPE GARDENING.

In this work a careful study is made of the characteristics and methods of propagation of ornamental and forest trees and shrubs together with the conditions under which they thrive the best, and the most effective arrangement in the forest, by the roadside or about the home or public grounds.

PROTECTION OF CROPS FROM INSECTS AND FUNGOUS PESTS.

Practical methods of destroying insects and fungi attacking the crops grown in this department are employed and all kinds of pumps are used or tested for this purpose.

THE NURSERY.

A nursery containing a large collection of both fruit and ornamental trees and shrubs is kept supplied in all stages of growth and the students are taught methods of propagation, training and pruning.

Chemistry and Physics

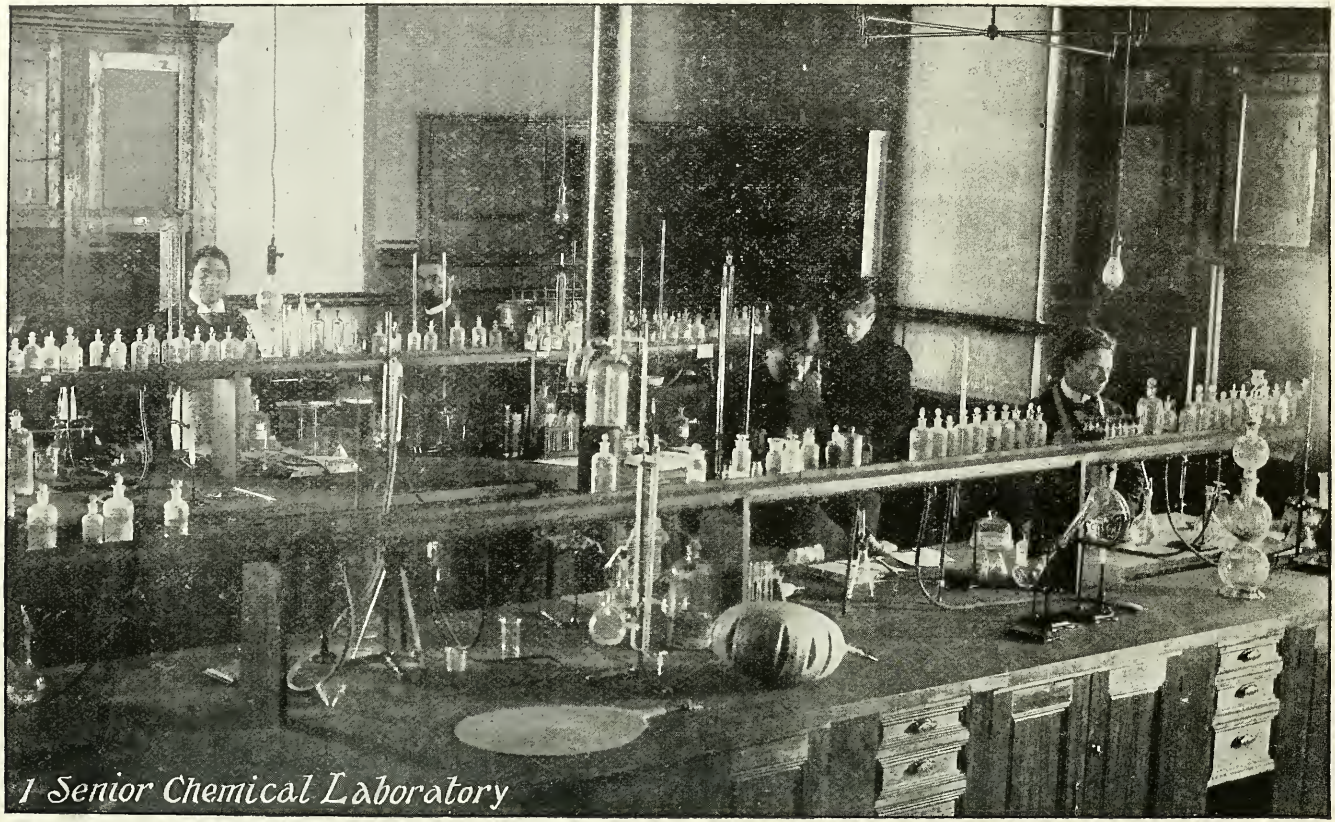
The Chemical Department.

The illustrations numbered one and two, show corners in two of the fourteen rooms of this department, and to a slight extent, the manner in which chemistry is here taught. In the large lecture room experiments are performed before the class. After a short course in demonstration by the instructor, the student goes into the laboratory to try his own hand under guidance. View No. 1 shows where such work is done. Three laboratories of good size are devoted to this kind of instruction. The smallest is used by students who have advanced far enough to act as assistants. It is illustrated in No. 2.

In the laboratory, rather than in the lecture room or from books, the chemical student gets his most valuable instruction. Here he comes into direct contact with what he must know intimately if he would win success from the material world. It is here that his wits are awakened, his powers of observation sharpened and his thinking capacity developed. Many a young man in trying to find potash or nitrogen, while at work in the chemical laboratory, has made the far more important discovery of an ability within himself which was hitherto wholly unknown and which later brought him success. The young man of to-day, who seeks his calling among the practical industries, should give the matter of selection his best thought. He should know first, what he *may* do, and secondly, what he *can* do.

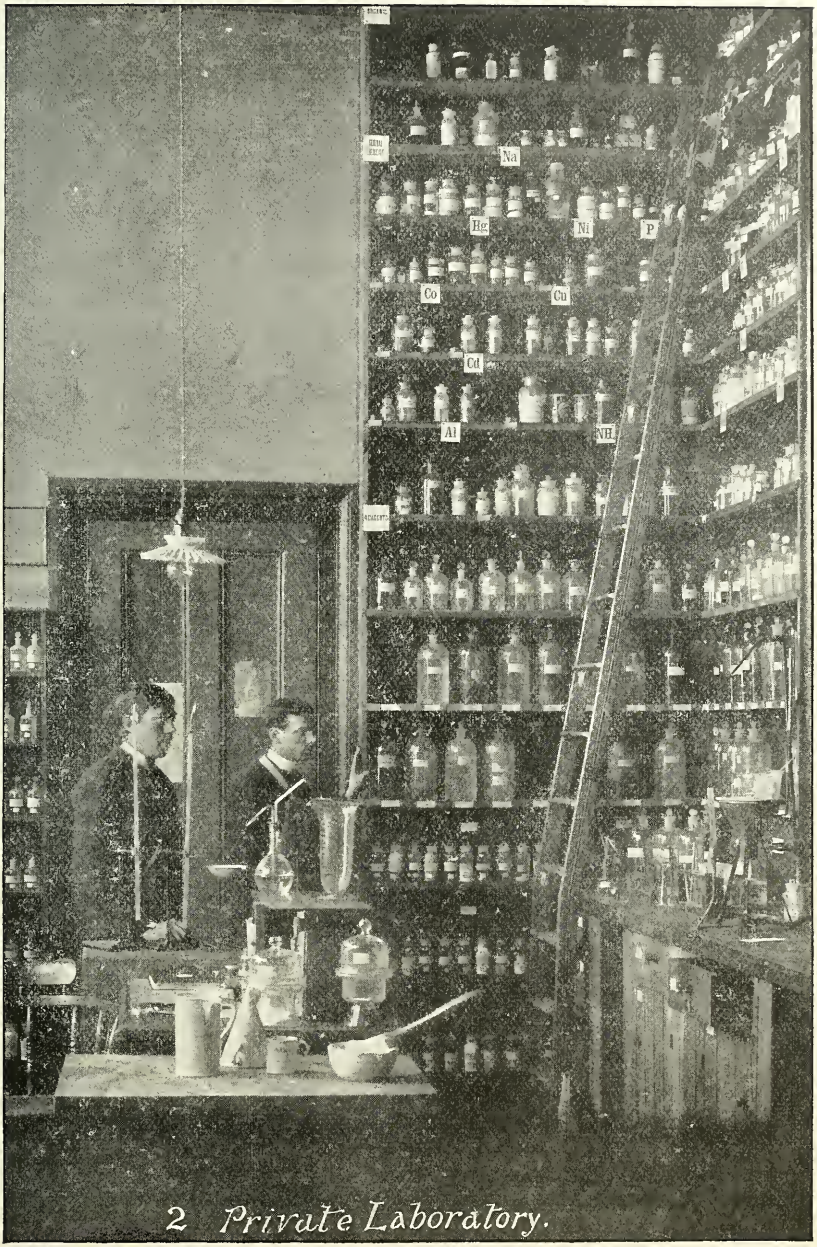
Chemical discipline is a most excellent means of attaining a comprehensive view of the world's work. Chemical study shows how to analyze the crude materials of nature, and tells the composition of rocks, soils, water and air. It gives like information concerning the finished products of nature, plants and animals, and the production of these from crude natural substances with the least possible cost. Such crude and finished products of nature furnish the raw materials for man to manufacture into all sorts of human necessities and conveniences. Chemistry teaches how to do this, how to procure useful metals from the earth, to make fat, sugar, starch and animal tissue into useful foods.

A multitude of dairy products are prepared for market and the table. Just now this industry is being revolutionized. The advanced dairyman is learning how to get high prices for his products, by producing *pure* milk, by carefully separating and selling, singly, the different constituents of milk, by changing the proportions of these in milk so as to get the best



1 Senior Chemical Laboratory

nutritive effect for different persons. Chemistry is doing this. It show how to make animal hides and pelts into boots, shoes and valuable furs, to make fibers like cotton, hemp and ramie from plants, and other fibers like, wool, hair and silk from animals into clothing and various articles of use and beauty. In short, this study introduces any young man, from city or country, to the outside world and to its great factories and business. This college offers to young men grand facilities for such an education and offers them at very low cost.



2 *Private Laboratory.*

Veterinary Science.

The course of instruction given in Veterinary Science is arranged in such a manner as to meet the wants of those students who after leaving college intend to follow agricultural pursuits, especially some branch relating to animal industry, or for those who after graduation propose further study of either human or veterinary medicine. Instruction is given to two classes, namely: To the students of the four year course electing the same and to those attending the dairy school during the winter term. One hour each day during the three terms of Senior year is devoted to its study, and two lectures are delivered each week to the special course students.

As at present arranged, the work in the department is confined to a consideration of the following subjects: Hygiene, Anatomy and Physiology, General Pathology, Materia Medica and Special Pathology.

The best methods of stable construction to insure perfect ventilation, lighting, drainage, cleanliness—the provision of a suitable water supply—the sources and dangers of water contamination, the injurious effects following the use of unwholesome food, over-feeding, etc., the care of animals in and out of the stable, the influence of clipping, the care of the feet in young horses and the principles of shoeing, are some of the matters discussed in connection with hygiene.

The anatomy and physiology of the bony, muscular, circulatory, respiratory and digestive systems, are studied sufficiently to enable the student to clearly understand how the structure or function may be interfered with or destroyed by the influence of disease.

The more common diseased processes and conditions frequently met with in a variety of ailments such as alterations in the blood, inflammations, fevers, etc. together with discussions referring to causes, symptoms and effects of disease are studied under General Pathology.

A sufficient time is given to Materia Medica to familiarize the student with the source, nature, action and uses of drugs, especially those simple ones that may be employed in emergency cases.

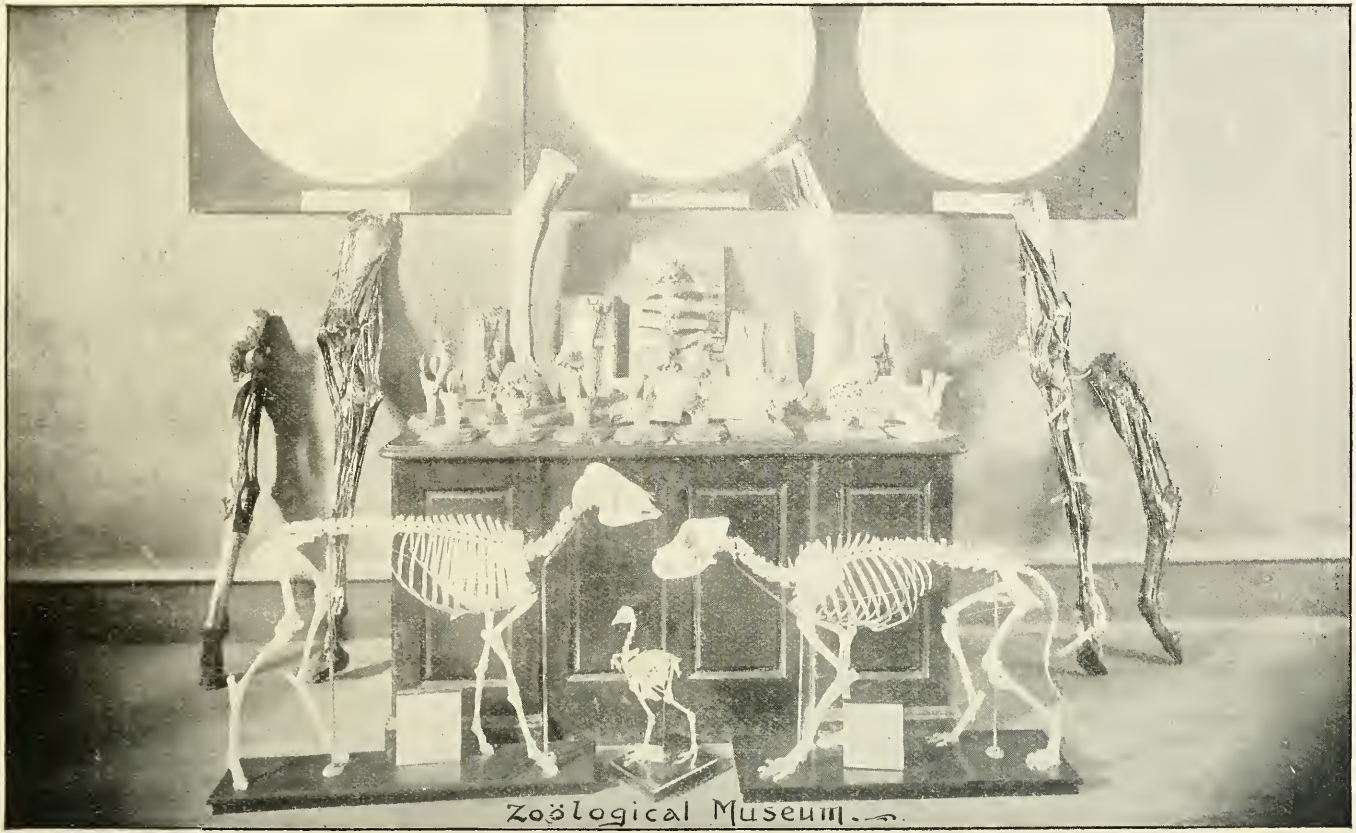
Under the head of Special Pathology the nature, causes, symptoms, treatment and prevention of various diseases are considered. Those most frequently occurring as a result of improper care, such as over-feeding, over-work, lack of exercise, exposure, etc., as well as those of a hereditary or contagious nature, the latter receiving particular attention on account of

their preventability by simple means under control of the farmer and their relation to public health. As examples may be mentioned indigestion, colic, founder, pneumonia, spavins, ring-bones, navicular disease, tuberculosis, glanders, rabies, trichinosis, hog cholera, etc.

The lectures in the class-room are supplemented by demonstrations and laboratory work. The accompanying illustration gives a good idea of a part of the material used in connection with class-room exercises. In laboratory practice each student is provided with a microscope and accessories and investigates for himself the nature of the parasites and germs and the diseases caused by them.

In so far as possible clinical demonstrations are held affording opportunity for the study of diseased animals. The principles of surgery are taught by lectures, and as occasion presents itself by operations.

To give a general idea of the principles of veterinary science in such a simple and comprehensive manner as to enable a man to give animals under his supervision such treatment as will tend to prevent the occurrence of disease among them, and to point out some of the ways by which diseases may be transmitted from the domestic animals to man and the means of controlling and eradicating such diseases is the chief aim of the course of study in this department.



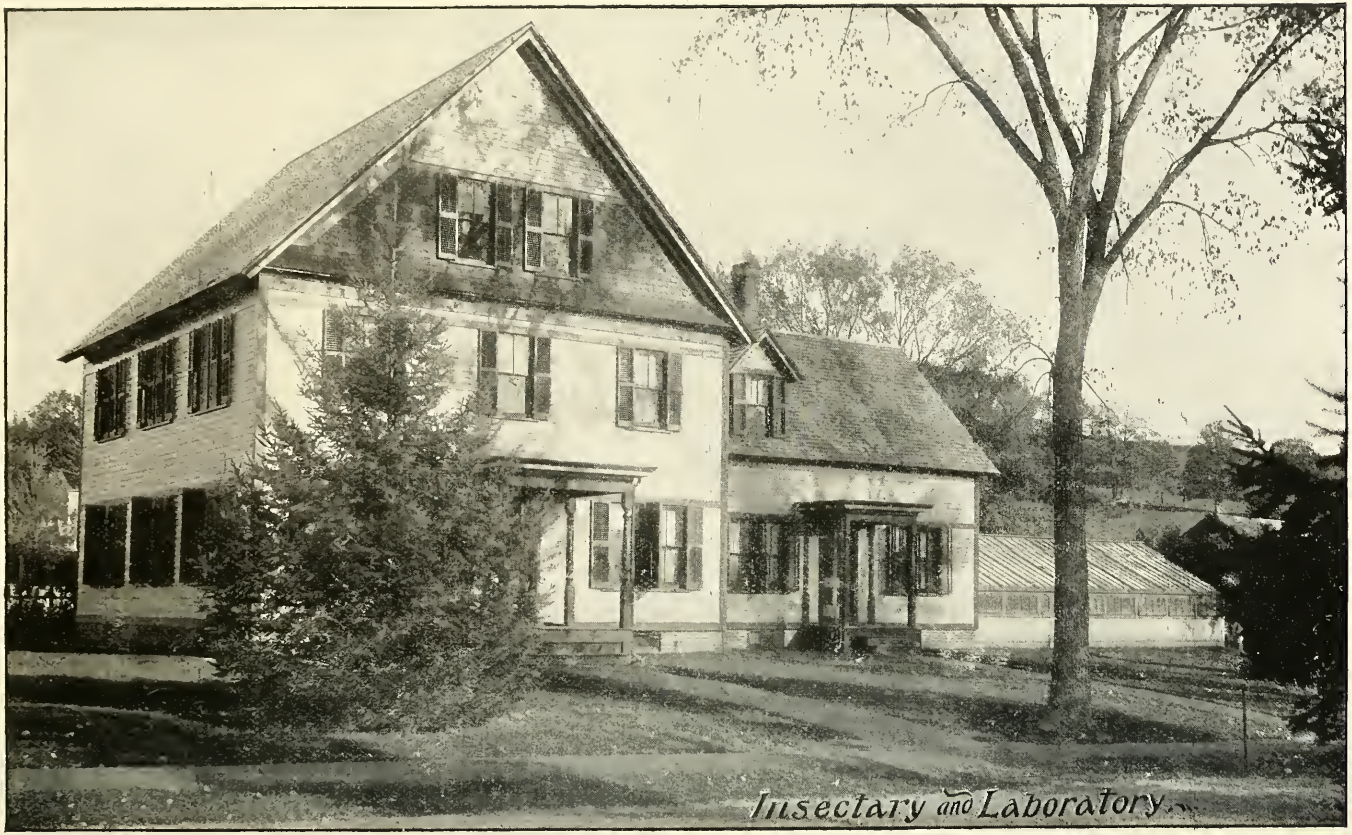
Zoölogical Museum.

Zoölogical Department.

The work of the department covers two broad subjects more or less akin to one another, that of physiology and that of zoölogy and entomology. The first is taken up by the student during the winter term of the Sophomore year and is continued for one term of eleven weeks, four hours a week. It is taught by means of a text book, from which recitations are assigned after first having been demonstrated by means of charts, manikins, skeletons, and preparations both microscopic and gross. The aim here is to give a good fundamental knowledge of bodily structure, the uses of the various parts, and such a knowledge of hygiene founded upon the physiological knowledge already gained as will enable the student to maintain and develop a good bodily health. The subject is taught moreover as a basis for the after study of the other subject taught in this department and for the veterinary science as well.

During the Junior year, first term, the study of zoölogy is taken up, the student spending eight hours a week on the subject. First a brief survey of the animal kingdom is taken, with special study of the microscopic forms, after which the student goes into the laboratory and studies the actual specimens, not alone the microscopic forms of which an abundance can be had from the pools and streams in the region round about; but the larger and more complicated creatures as well, the idea being to let the student see for himself by actual dissection the precise anatomical nature of at least ten different types of animal life ranging in complexity from the fresh water polyp to the dog or cat. A lecture course is offered in systematic zoölogy during the winter term, a continuation of that commenced during the fall, which is designed to give a comprehensive view of the animal kingdom in order to show the relationship of animals to one another and to man, the origin and development of the different organs of the body, the development of the individual as compared with that of the race, and to take up in succession every animal of interest possible, except the insects.

These lectures are abundantly illustrated by charts, dissectible models and preparations. These, when not in use, are arranged in a museum, in such a way as to emphasize silently, but eloquently the truths already taught in the lecture room. This museum contains over four-and-a-quarter thousand distinct species comprising more than twelve thousand named



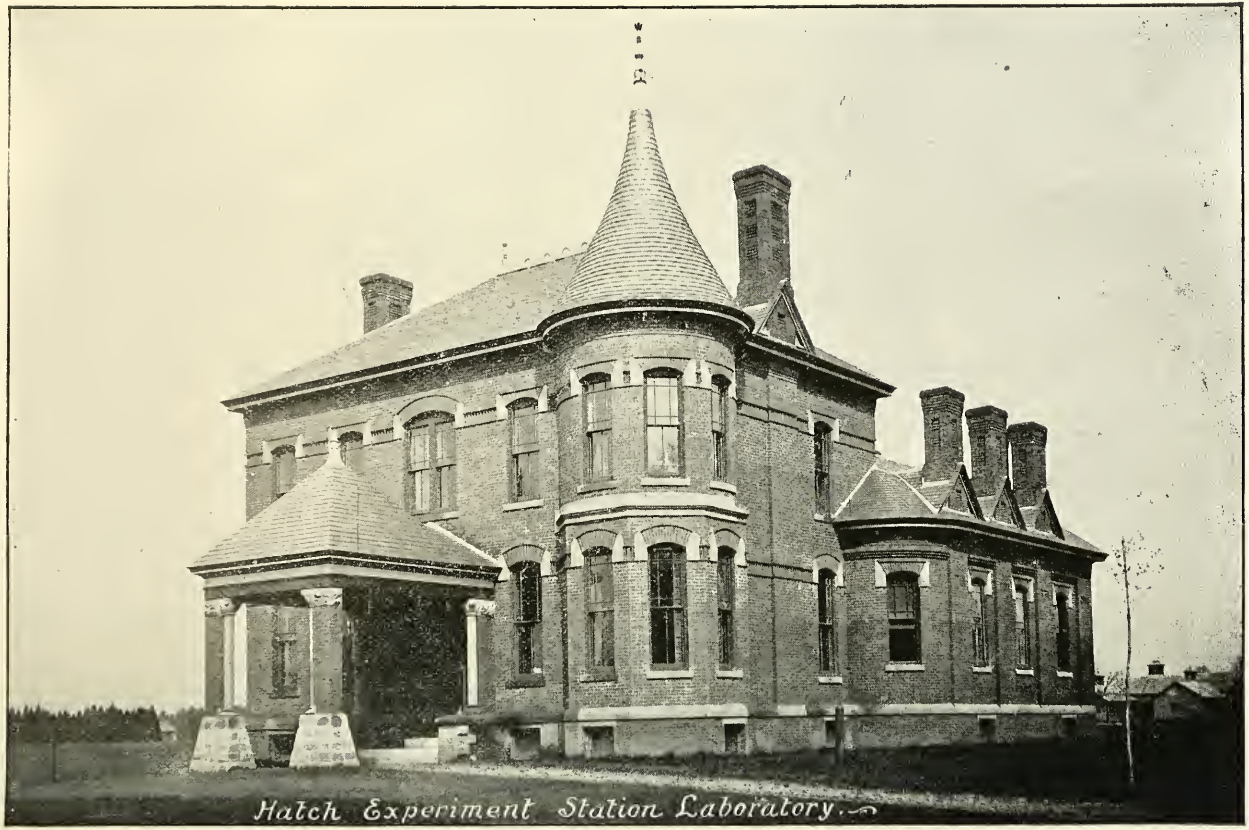
Insectary and Laboratory.

specimens, and for its size is one of the most complete owned by any college in the country.

The summer term Junior year is given up to the study of entomology for six hours each week. The work in this course is both anatomical and systematic, as well as economic, the course serving, not alone to give those who elect entomology the Senior year, a good foundation for their advanced work, but to give to all the students of the college enough of a knowledge of the subject to enable them to proceed with intelligence in waging war against insect enemies wherever they may be found. Each man is required to mount, name, and arrange a small, but complete collection of insects of his own gathering.

The work of the student in this department during the Senior year is entirely elective and is confined to advanced work in entomology. It extends throughout the year eight hours a week and consists largely of laboratory work, in addition to which is a series of about forty lectures extending through the entire course. These lectures cover a large number of topics such as anatomy, embryology, transformations, insect architecture, luminosity, parasitism, etc., and are amply illustrated with charts. The students are required to recite on these lectures. The laboratory work consists of the study of insects themselves and that of entomological literature. The student first makes a general survey of the whole subject, studying the external anatomy of representatives of each order of insects and the internal anatomy of a larva, a pupa, and an imago or adult insect. He then passes on to the preparation of a thesis chosing his subject in accordance with his choice of profession in order that he may be benefited in his future work by the knowledge thus gained.

This course is of great value to one whose purpose it is to be either a farmer, a market gardener, a fruit grower, or one interested in forestry, as the knowledge here gained may mean a great saving of money in the future; while to the one who would be a professional entomologist or a teacher of biology it gives an entomological training second to that offered in no institution in the world.



Hatch Experiment Station Laboratory.

The Hatch Experiment Station.

The experiment department of the college is known as the Hatch Experiment Station. It has a director and seven distinct divisions as follows: Agriculture, Horticulture, Botany, Chemistry (fertilizers and fertilizing materials), Chemistry (foods and feeding), Entomology and Meteorology. Besides the heads of the several departments ten assistants are employed. These men are generally selected from the graduates of the college who have done creditable work during their college course and who have especially prepared themselves for station work. The station often finds difficulty in retaining their services for any length of time, because from their training, superior financial inducements are offered them elsewhere.

Station Buildings: A large laboratory building, recently remodeled is devoted exclusively to the chemical work of the station. Near by is situated the substantial physiological laboratory with greenhouse attached, for the purpose of studying plant growth and disease. Two large storage barns, together with a considerable area of land, is set aside for the use of the agricultural department. The department of foods and feeding has a stable of its own, especially arranged for animal experiments. The entomological and horticultural departments have suitably equipped green houses for experimental work; the latter department devotes quite an area of land and experiments to fruit culture.

Work of the Station: The work of the station can be divided into three parts: (a) information, (b) control, (c) investigation.

The various officers of the station are ready at all times to give information on any topic connected with the different branches of agriculture. It is always the object of the station workers to answer all inquiries as fully and promptly as possible.

The control work includes the inspection of commercial fertilizers as required by law. The analysis of all kinds of fertilizing material, cattle feeds, drinking waters, and dairy products, as well as the identification of grasses, insects, and fruits, is made free of cost for all parties within the state.

There is constantly being carried on at the station, various original investigations of many problems connected with agriculture. The chemical and agricultural departments are studying the special uses of the different kinds and combinations of plant food for different crops, the adaptation of soils to crops, and the most desirable varieties of plants to grow for specific

purposes. The botanical and entomological divisions are concerned especially with the different plant diseases and insects that attack plants, and how best to check their ravages. The department of horticulture is studying problems in fruit culture, while the feeding department is engaged in investigating the relative values of cattle feeds, and in noting the effects of these feeds in different combinations, upon the cost and quality of the resulting products.

Bulletins containing the results of the investigation and control work, are published at intervals during the year, for free distribution to all parties who apply for them. An annual report is also published, giving a summary of the year's work.

For bulletins or information, address the Hatch Experiment Station, Amherst, Mass.

Political Science.

To make the good citizen and the successful man of business is the aim of this department. To members of the short winter courses are offered eleven lectures on the economics of agriculture. The topics discussed are the farmer as a landlord, capitalist, business manager and laborer; the farmer as related to taxation, railroads, coöperation, banking and the currency; the English farmer; the American farmer. To members of the Senior class the following courses are offered:

1. Principles of Political Economy by text book and lectures. The object is to make the student familiar with the essential facts, laws and methods of investigation used in the science so that he may be able to understand and criticise current discussions and make use of the best authorities.

2. Industrial History of England and America. The aim is to discover what the actual results have been of the practical working of economic theory in the production, distribution and consumption of wealth.

3. A course of lectures on economic problems of to-day, including monopolies, finance, relations of labor and capital and the economics of agriculture.

4. Practical work on the part of the student toward the solution of economic problems. He selects a question in which he is specially interested and makes a thorough study of the subject using original sources of information. He is taught to observe the facts, classify them and give a rational explanation. The results of his work he presents to the class in the form of a thesis which he is to defend against all objections.

5. Science of Government. The fundamental principles of government are examined as set forth in the constitution of the Commonwealth, and of the United States. A study is then made of the town, city, country, state and federal institutions of government, as to their origin, development and practical working. The purpose is to make clear the duties and privileges of the American citizen.

M·A·C Battalion

The Military Department.

The Military Department of the Massachusetts Agricultural College has a three fold object in view, first the dissemination of military knowledge and training throughout the country so that in event of war the United States will have a certain number of trained soldiers at its disposal for commissioned officers of volunteers, second the physical exercise and muscular training which is universally conceded to be a very important factor in the development of the youth of the country and third the inculcating in young men that respect for those in authority which can only be obtained through a certain amount of military discipline and for which all men become better citizens.

In order that the first object may be satisfactorily attained, officers of the army are detailed, at the request of the college authorities, to certain state colleges or institutions which are fostered by the general government. The duty of these officers is to train the students in military science and tactics. The government also supplies this college with rifles and equipments for same, two 3.2 breech loading field pieces of the most modern pattern, and a certain amount of ordnance supplies annually. In addition the college has built a large and commodious drill hall and gymnasium, an armory, gun shed, recitation room and commandant's office. I doubt if there is an Agricultural College in the United States where the military department is as thoroughly equipped as the Massachusetts Agricultural College or one where the drill and discipline of the military department are more thoroughly appreciated by the college authorities.

There are three hours drill a week for the whole college and one hour recitation for the Senior class. The cadets are instructed in infantry drill through the school of the battalion in both close and extended order, in sabre exercise and school of the trooper dismounted, in the school of the cannoneer, in signalling with heliograph and flag, in target shooting, and in a course of lectures covering advance and rear guards, outpost and picket duty, reconnaissance, castramentation, hygiene, hasty intrenchments, elementary field engineering and military law.

The same amount of proficiency is required as in the other departments of the college and a military diploma is given at the end of the college course to all those who have been pronounced proficient.

Drill Hall and Fire Brigade.

No one who has ever seen the corps of cadets at West Point can doubt the benefits of military drill to the young man's physique and although limited time does not enable us to do as much in this respect as we would like, yet all must agree when it is said that the most is made of what time we have and that a young man becomes a better citizen for being well "set up" and for having been subject to military discipline for a part of his college course.

Student Organizations and Enterprises.

The undergraduate organizations play an important part in modern college life, and we give a brief summary of the work being done here by such organizations, believing that it will be of interest to prospective students.

AGGIE LIFE.

The *Aggie Life*, a sixteen page bi-weekly journal, is the official organ of the college, and is edited and managed by a board of ten students; five from the Senior, three from the Junior, and two from the Sophomore class respectively. The editorial positions are awarded to those who do the best work in an open competition, the appointments being made by the Senior members of the retiring board. The tone of the paper is high, and it compares very favorably with the best college journals in the country.

THE INDEX.

The college annual known as the *Index* usually takes the form of a handsome book of about 240 pages. It is published by the Junior class, a board of eight men being elected from this class to have charge of the editorial work. The book contains class and society lists, a classified list of the alumni, college organizations, athletic and other associations, and the happenings of the year.

THE N. H. S.

The Natural History Society has for its object the study of the natural sciences. It is one of the most important of college associations, and is well organized under its student officers and board of directors. During the spring and fall, excursions are made to various localities of interest in the surrounding country, while the winter work is carried on in the form of lectures given one each week by members of the faculty or by students pursuing some original work.

A. Montgomery, Jr. J. A. Emrich, C. L. Goessmann, W. E. Hinds, F. H. Turner,

C. F. Palmer, J. M. Barry, G. D. Leavens, R. D. Warden.

"AGGIE LIFE" BOARD.

Y. M. C. A.

The Young Men's Christian Association is the center of the religious interest of the college. Its influence upon the students is most beneficial, and under its direction are conducted the Sunday Morning Bible Class, and the Sunday and Thursday prayer meetings. The association is thoroughly organized with officers and committees for the different departments of its work.

GLEE AND BANJO CLUBS.

These hold an important place here as they do in every American college. The clubs have competent leaders and excellent trainers, under whose direction very creditable concerts are given. The clubs usually go on two or three short trips each season, these trips being so arranged as not to interfere with regular college duties.

FOOTBALL ASSOCIATION.

This organization is supported by voluntary contributions from the students, and is carefully managed. No men deficient in their regular college work are allowed to play on the team. This is true of all our college teams. Early each fall the captain calls out the candidates for the team, and under the direction of the captain and the coach a strict course of training is followed. No favoritism is shown, and to the best men are given the positions.

BASEBALL ASSOCIATION.

The organization and management are similar to those of the football association. Practice is carried on in the drill hall during the winter as a preparation for the out-of-door work in the spring. A strong team is usually developed.

READING ROOM ASSOCIATION.

This association is supported by a small tax levied upon the students, and has charge of the distribution of the mail, and also of the reading room. Here are furnished the leading daily papers of the country, the monthly magazines, and all of the more important weekly publications, comic and otherwise.

ATHLETIC ASSOCIATION.

During the winter interesting athletic meets are held in the drill hall gymnasium, and in the spring a field day devoted largely to track athletics is given.

POLO ASSOCIATION.

Each winter, games of polo are arranged with other colleges, and many of these are played on the college pond.

H. F. Allen, J. E. Halligan, W. R. Crowell, J. A. Emrich,
J. C. Chapman, C. M. Adams, J. A. Davis, J. C. Burrington, P. H. Smith,

L. L. Cheney, A. D. Gile, J. W. Allen, C. I. Goessmann, G. F. Parmenter, J. S. Eaton.
D. A. Beaman, Y. H. Canto, G. H. Wright, H. E. Walker, F. G. Stanley.

FOOTBALL TEAM.

W. E. Hinds, C. A. Norton, H. T. Edwards, W. B. Harper, F. H. Read, R. D. Warden,

N. Shultis, J. S. Eaton, J. L. Marshall, W. A. Hooker, F. B. Shaw,
E. W. Capen, J. A. Emrich.

BASE-BALL TEAM.

TENNIS ASSOCIATION.

There are excellent tennis courts at the college, and each spring the Tennis Association conducts a tournament, awarding prizes to the most skillful players.

THE K. K. K.

The K. K. K. or Kollege Kemical Klub is an organization recently founded for the purpose of advancing the social and intellectual life of the students. A *kneipe* is held once in two weeks, and a *commers* given once during each term.

SECRET SOCIETIES.

There are four secret societies in the college: D. G. K., Q. T. V., $\Phi \Sigma$ K. and the College Shakespearean Club.